

CLAIMS:

1. A method of determining at least local height of an object surface by scanning an illumination radiation beam and the object surface relative to each other in a scan direction and determining the intensity of radiation reflected by the object surface by means of an image sensor comprising a number of pixels, characterized by the combination of the steps

5 of:

- scanning the surface by an illumination beam having an intensity distribution showing one main maximum;

- determining when a sensor pixel receives a maximum radiation intensity thereby establishing the position, in the scan directions, of an illuminated surface area

10 associated with said sensor pixel, and

- measuring the distance, in a direction substantially to the scan direction, between said surface area and the image sensor.

2. A method as claimed in claim 1, characterized in that use is made of an

15 illumination beam having a slit shaped cross section having a width direction in the scanning direction and having said intensity distribution in the width direction.

3. A method as claimed in claim 2, characterized in that use is made of an illumination beam having a Gaussian intensity distribution.

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4. A method as claimed in claim 2, characterized in that use is made of an illumination beam having an intensity distribution showing at least one auxiliary maximum different from the main maximum.

25 5. A method as claimed in claim 1, 2, 3 or 4, characterized in that scanning is performed by moving the illumination beam and the surface in a direction parallel to the surface.

6. A method as claimed in claim 5, characterized in that scanning is performed by moving a radiation source unit supplying the illumination beam with respect to the surface.

5 7. A method as claimed in any one of the claims 1-6, characterized in that the height of a first surface area with respect to a second surface area is determined from the difference between a moment maximum intensity is actually detected and the moment maximum intensity is expected to occur.

10 8. A method as claimed in any one of claims 1-6, characterized in that the moment a surface area is illuminated with maximum intensity is estimated from data obtained during illumination of other areas.

15 9. A method as claimed in any one of claims 1-8, characterized in that use is made of diffusely reflected radiation, which is reflected in a direction substantially perpendicular to the surface.

10. A method as claimed in any one of claims 1-8, characterized in that use is made of specularly reflected radiation.

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11. A device for determining at least local height of an object surface measuring according to the method of claim 1, characterized in it comprises:

- a radiation source unit comprising a radiation source, comprising a radiation source and a member with a transparent slit, for supplying an illumination beam having a slit shaped cross-section and having, in the direction of the slit width an intensity distribution, which shows one main maximum;
- means to move the radiation source unit and the surface relative to each other in plane parallel to the plane of the surface, and
- an image sensor comprising a number of pixels for receiving radiation reflected from a surface region illuminated by the illumination beam;
- a data processor coupled to the image sensor, for determining when a sensor pixel receives maximum intensity thereby establishing the position of the surface area associated with said sensor pixel and for determining the height of said surface area.

12. A device as claimed in claim 11, characterized in that an optical system for imaging the surface on the image sensor is arranged between the surface and the image sensor.

5 13. A device as claimed in claim 11 or 12, characterized in that the image sensor is arranged in the path of diffusely reflected radiation, which radiation is reflected in a direction substantially perpendicular to the surface.

10 14. A device as claimed in claim 11 or 12, characterized in that the image sensor is arranged in the path of specularly reflected radiation, which is reflected at an angle with the normal to the surface substantially equal to the angle of incidence of the illumination beam on the surface.

15 15. A device as claimed in any one claim 11 to 14, characterized in that the radiation source unit comprises a halogen lamp and the slit has a width less than 0.1 mm.

16 A device as claimed in any one of claims 11 to 15, characterized in that the angle of incidence of the illumination beam on the surface is between 30⁰ and 60⁰.

20 17. A device as claimed in any one of claims 11 to 16, characterized in that at least one of the image sensor and the data processor comprises at least one programmable unit.

25 18. A computer program product for use with the method of claim 1 and comprising program code portions for enabling a programmable device to perform steps of the method when running on said programmable device.